



**2009**

**NCDOT**

**Erosion and Sedimentation Control Program  
Annual Report**



# **NCDOT EROSION AND SEDIMENTATION CONTROL PROGRAM 2009 ANNUAL REPORT**

## **NCDOT EROSION AND SEDIMENTATION CONTROL PROGRAM**

In 1991 the NC Sedimentation Control Commission reviewed the NC Department of Transportation's efforts to comply with the Sedimentation Pollution Control Act of 1973 and the subsequent 1974 NCDOT Delegated Erosion and Sedimentation Agreement.

Based on the review, the 1974 agreement was updated. The revised agreement was submitted to, and approved by the Sedimentation Control Commission on February 25, 1991 and functions as the core of the current NCDOT program.

Within NCDOT, the Roadside Environmental Unit monitors the delegated authorities. This includes design, review, monitoring and training for all aspects of the Erosion and Sedimentation Control Program. Improvements in technology and research have in turn improved design standards and techniques for erosion and sedimentation control.

The attached annual report outlines and highlights the work implemented and accomplished in 2009. It is important to note that this is an overview of the NCDOT Erosion and Sedimentation Control Program and provides a summarization of the programs overall content.



**US 311** Corridor shows the many challenges faced in linear construction projects.

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## **PROGRAM OVERVIEW**

During fiscal year 2008/2009 NCDOT remained committed to minimizing impacts to the environment while providing safe and efficient transportation venues. The Department's efforts are evident in many areas; design, research, certification and overall environmental stewardship.

The Executive Summary (page two) provides an overview of the program for the past four years.

### **NCDOT Certification Effort as of July 1, 2009**

**The following represents the number of personnel certified by N.C. State in the Department's Environmental Certification Initiative.**

• Level I:	1367
• Level II:	2649
• Level IIIA:	448
• Level IIIB:	437

## NCDOT EXECUTIVE SUMMARY

Fiscal	Fiscal	Fiscal	Fiscal
Year	Year	Year	Year
2006	2007	2008	2009

### Design

#### Contract Construction

Total Field Inspections Attended	105	85	80	111
Total Clearing and Grubbing Plans	58	65	141	138
Total Intermediate/Final Plans	60	68	145	140
Percent Clearing and Grubbing of Final Plans	97%	96%	97%	98%

#### Maintenance/Force Account Projects

Total Bridge Maintenance Plans Prepared	40	119	108	85
Total Maintenance Plans Prepared	414	443	473	287
Total Maintenance/Bridge Plans Reviewed	296	360	464	372
Percent Reviewed	71%	64%	80%	76%

#### \*\*General Services Facilities Projects

Total General Services Plans Prepared/Reviewed	NA	NA	4	3
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#### \*\*\*NC Turnpike Authority Projects

Total NC TA Plans Prepared/Reviewed	NA	NA	0	3
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### Disturbed Acreage

*Contract Construction (acres)	3860	4375	3945	4211
*Maintenance/Force Account (acres)	1045	1107	1245	1015

### Monitoring

#### Contract Construction

Inspections Accomplished	2557	1719	1960	2545
ICAs Issued	18	15	9	7
Number of Projects Receiving ICAs	15	6	4	6
Projects Receiving Sequential ICAs	3	9	2	1

#### Maintenance/Force Account Projects

Inspections Accomplished	3433	4124	3995	3548
ICAs Issued	0	3	5	4
Number of Projects Receiving ICAs	0	3	5	2
Projects Receiving Sequential ICAs	0	0	0	1

#### \*\*General Services Projects

Inspections Accomplished			9	34
ICAs Issued			0	0

Total NOV's Received	0	0	0	0
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### Certification (Number Certified as of 7/1/2009)

Level I: Erosion & Sediment Control/Storm water	NA	836	1067	1367
Inspector/Installer				
Level II: Erosion & Sediment Control/Stormwater Site	NA	1878	2172	2649
Management				
Level II: Recertification				518
Level III A: Design of Erosion and Sediment Control	NA	288	392	448
Plans				
Level III B: Design of Reclamation Plans	NA	325	388	437

\*estimated

\*\* The Departments General Services Section is responsible for the construction of NCDOT office facilities. NCDOT was granted erosion and sedimentation plan approval and monitoring authority for these projects.

\*\*\* The North Carolina Turnpike Authority did not have any projects for the 2009 fiscal year.



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## DESIGN

NCDOT implements the requirements for sediment basin design as outlined in the “Erosion and Sedimentation Control Design Manual.” Further efforts have been placed on reducing the amount of time an erodible surface is exposed by utilizing more rolled erosion control products to minimize subsequent repair seeding operations.

The Department is using the Revised Universal Soil Loss Equation to model soil loss from secondary road and small bridge construction projects. RUSLE2 models the detachment of soil particles based on several factors.

Revisions to erosion and sediment control plans are documented by field forces and reviewed by the department’s REU staff to ensure that proper design techniques are being utilized. Certification efforts are addressing the changes in plan design to both NCDOT personnel as well as private engineering firms.

Overall, the Design effort continues to minimize impacts and find the balance between erosion control and sediment capture.



**Design:** Erosion and Sediment Control Plans for the Fayetteville Outer Loop

## INSPECTION



**Teamwork :** NCDOT relies on a series of inspectors and engineers to ensure compliance with the Delegated Agreement.

NCDOT relies on a combined effort to review and inspect projects to ensure compliance with the Sedimentation Pollution Control Act of 1973.

The REU reviews projects on a routine basis to evaluate project performance and overall compliance with the mandates set forth by the Delegation Agreement with Land Quality.

The Field Operations Section of the REU utilizes 14 certified engineers and technicians to review and monitor the progress of the Department’s Erosion and Sedimentation Control program. The success of the program is dependent on the hundreds of DOT engineers, technicians, contract personnel and consultants that routinely review and make the necessary corrective actions across the state on the Department’s projects.

When problems are identified, the Field Operations staff will issue an Immediate Corrective Action (ICA) which initiates a series of protocols created to ensure the corrections are made in a timely manner.

## CERTIFICATION

The Biological & Agricultural Engineering and Soil Science Departments at N.C. State University are partnering with NCDOT to offer an Erosion and Sediment Control/Stormwater Certification Program. The certification program provides the required personnel training to ensure compliance with erosion and sediment control/stormwater provisions on NCDOT projects.

NCDOT requires all contractors and consultants to have a certified supervisor and foreman to oversee operations on NCDOT projects to ensure compliance with the Sedimentation Pollution Control Act as well as other environmental regulations.

Certification must be renewed every two years. Certification of

### CERTIFICATION LEVELS

- **Level I:** Erosion & Sediment Control/Stormwater Inspector /Installer
- **Level II:** Erosion & Sediment Control/Stormwater Site Management.
- **Level III A:** Design of Erosion and Sediment Control Plans
- **Level III B:** Design of Reclamation Plans

Web Link:

<http://www.bae.ncsu.edu/workshops/dot/index.html>

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## EFFICIENCY

**RESEARCH:** The Department is working with N.C. State University to monitor the impacts to water quality on the US 19 projects in Madison and Yancey County. The monitoring by researcher Dan Line, PE will aid NCDOT in evaluating the performance of the current erosion and sedimentation control practices.

**NEW TECHNOLOGIES:** The knowledge gained from research and monitoring has resulted in the Department utilizing devices such as fiber check dams with the addition of polyacrylamides. The combination of these two technologies has shown positive results in the improvement of sediment basin efficiency. Increased efficiency of sediment basins along with a reduction in the exposure time of erodible areas has improved the Departments ability to protect water resources and environmentally sensitive areas.

**NEW TECHNIQUES:** The Department will research how using new erosion techniques affect the design criteria for sediment basins. The research will be beneficial in areas where large basins are difficult to install.



**Improvements:** Skimmer Basin with improved fabric lined weir section.

## 2009 FIELD REVIEW



**SR 1300 B.H. Duncan Road**  
Ashe County - Project constructed along a stream designated as Trout Waters.

Based on a random selection by DENR Land Quality Section 16 projects were chosen for review. Projects are reviewed jointly by NCDOT and Land Quality staff to determine the overall program performance.

The following is a list of the projects that were selected for the 2009 Field Review.

### WESTERN REVIEW:

- US 19E near Burnsville
- Crabtree Creek Bridges
- SR 2850 Garrison Rd
- Brawley School Rd
- SR 1300 B.H. Duncan Rd
- SR 1739 Bill Blackwell Rd
- US 1 Widening
- Big and Little Beaver Creek Bridge

### EASTERN REVIEW:

- Fayetteville Outer Loop
- SR 1460 Ward Rd
- Harrell Waste Pit
- Oil Terminal Waste Pit
- Rocky Mount Connector
- Sandy Creek Bridges
- Global Trans. Park
- SR 1275 Cobbtown Rd

Recommendations were made to the Department for follow up.

## WARD ROAD

**SR 1460 Ward Road** in Columbus County was selected for the eastern review. The project is located along the NC/SC State line.

It was noted that the project had accumulated sedimentation adjacent to one of the stream crossings on the NC side.

The picture to the right was taken of the location where the sediment had accumulated.

The accumulated sediment was removed and disposed of accordingly. No further action was taken since the project was in a stable condition at the time of the removal.



**Ward Road** located along the SC line in Columbus



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## WASTE PITS



*Stockpiled material located in the Oil Terminal Pit*

The 2009 Field Review included several waste pits utilized by NCDOT maintenance forces. The Harrell waste pit and the Oil Terminal waste pit were selected for review.

The Harrell pit was found to be effective. The Oil Terminal pit did not have an adequate plan but the situation has been corrected and plan revised.



**South Carolina:** SR 1460 Ward Road in Horry County South Carolina.

## BASIN SIZE

The Department continues to search for design methods that will accurately predict run-off rates and sediment loss.

New technology is utilized when large sediment devices can not be installed due to topography or because of safety related issues when installed adjacent to a roadway that is still active with traffic.



*US 19- Typical basin size required for linear construction*



**New Technology:** Increased use of Fiber Check Dams in association with Polyacrylamide is proving to be more efficient than some traditional measures.



*Trout buffer extends to the middle of the Roadway*



**Vegetation:** NCDOT continues to reduce the amount of time of exposure for erodible soils with the use of vegetation and rolled erosion control products.

## TROUT WATERS

The 2009 Field Review consisted of two projects constructed along streams that are designated as Trout Waters, US 19E and SR 1300 B.H. Duncan Road in Ashe County. The Department makes every attempt to avoid trout buffer zone impacts by the use of vegetation and rolled erosion control products.

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## INFILTRATION BASINS



*Infiltration Rates exceed the need for skimmer device.*

The Department now incorporates basins that de-water through ground infiltration. When sandy soils exist and the infiltration rates are sufficient, this is a viable way to dewater a sediment basin. In eastern N.C., NCDOT's skimmer basins have evolved into infiltration basins. The Department will continue to investigate when and where these devices can be used.



**Review:** Monthly meetings are held on specific projects with Regulatory Agencies to review compliance with permits and to analyze the progress of the project.

## ENVIRONMENTALLY SENSITIVE

The Department not only complies with the Sedimentation Pollution Control Act, but also with 401 and 404 permit conditions. New methods are continually devised to accommodate the challenges of roadway construction through environmentally sensitive areas. Construction bridges lined with fabric are often required to avoid impacts to wetlands and other environmentally sensitive areas.

Highly visible fencing is used to designate the boundaries of environmentally sensitive areas that are to be protected and limit the type of work that can occur. This impacts the type of erosion control device that is allowed.



*Highly visible fencing delineates environmentally sensitive area*



**Impacts:** Construction bridges are used to reduce the impacts to wetlands and other environmentally sensitive areas.

## FUTURE CHALLENGES



**Challenges:** Installation of large devices on steep terrain will always present problems.

With tighter regulations on effluent discharge by the EPA, to varying requirements set forth by the Department of Water Quality NCDOT faces new challenges in 2010 .

The NPDES and E&SC inspection requirements are being merged to streamline and improve efficiency to our current monitoring protocols.

Further improvements to our design methods will evolve as our knowledge of the use of new technologies expand.

NCDOT is committed to meeting these challenges and providing the level of service the citizens of North Carolina have grown to expect.